INITIAL REVIEW ENGINEERING REPORT [redacted]
PMN: 18-0147

Focus Ready Draft 4/30/2018
ENGINEER: Al-Haddad \ AR
PV (kg/yr): [redacted]

SUBMITTER: JSR Micro, Inc.

USE: [redacted] for [redacted] photolithography for [redacted]

Analogs [redacted]

OTHER USES: [redacted]

MSDS: Yes Label: No

Gen Eqpt: The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces. Use explosion-proof ventilation equipment. Wear impermeable gloves and clothing during activities where there is potential for direct skin contact with chemical. Wear primary eye protection such as splash resistant safety goggles with a secondary protection faceshield. Provide an emergency eye wash station and quick drench shower in the immediate work area.

Respirator: Under conditions of frequent use or heavy exposure, respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use. NIOSH approved respirators as follows: Any chemical cartridge respirator with organic vapor cartridge(s).| Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s). Any air-purifying respirator with a full facepiece and an organic vapor canister. For Unknown Concentrations or Immediately Dangerous to Life or Health. Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.

Health Effects: May cause narcotic effects and respiratory irritation. Causes skin irritation. Causes serious eye damage. May cause irritation to nose and throat.

TLV/PEL:
None established

CRSS (04/12/2018):

Chemical Name: [redacted]

S-H20: 1E-06 g/L @
VP: 1.0E-6 torr @
MW: 5000.00 1.00%<500 5.00%<1000
Physical State and Misc CRSS Info:

Neat: Solid (est.) Mfg: NK - Imported Proc/Form: Solution, [redacted] PMN material in solvent diluted to [redacted] in formulation End Use: Solid, PMN material entrained in coating then destroyed. Submitted data: NAVG MW = 5000 by GPC with 1% less than 500 and 5% less than 1000; the submitter also provided a GPC for the PMN material that gave a [redacted]. The submitted 1H NMR spectrum is consistent with the structure provided. The submitted MSDS is for 10-20% PMN material in ethyl lactate/propylene glycol monomethyl ether acetate. UV-Vis spectrum was provided. Estimated data: high boiling point and negligible vapor pressure and water solubility (high MW polymer).

[redacted]

Consumer Use: No

SAT (concerns) (04/13/2018):

Related Cases and Misc SAT Info:
Same as [redacted]
Analogs: [redacted]

Migration to groundwater: Negligible

PBT rating: P0.0B0.0T1
Health: 1.5 Dermal, Drinking Water, Inhalation, Other

Eco: 0.0

OCCUPATIONAL EXPOSURE RATING: [redacted]

NOTES & KEY ASSUMPTIONS:
Generated by the 09/30/2013 version of ChemSTEER. Input to ChemSTEER tool includes information from: the PMN submission, physical / chemical properties, and the [redacted]. The LVE is used as a component of a [redacted]. The LVE is import only; therefore, only PROC and USE operation were assessed. SAT concerns are for dermal, inhalation, and drinking water. // The following same submitter, same use past cases were referenced for consistency: [redacted] All past cases referenced the [redacted] Use in [redacted] for the end use assessment, where appropriate (consistent with this IRER). LVE in all past cases were imported, formulated at one submitter site, then distributed to downstream end users (consistent with this IRER). Primary difference in this IRER is that EPA references the default [redacted] use rate and submitter est. of number of use sites in calculating the number of operating days for the use operation.

POLLUTION PREVENTION CONSIDERATIONS:
No Pollution Prevention information was provided by the submitter.

EXPOSURE-BASED REVIEW: No

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PROC: [redacted]

Number of Sites/ Location: 1

JSR MICRO, INC SUNNYVALE CA 94089

Days/yr: [redacted]

Basis: Submission estimates that the LVE in processed at 1 site, [redacted] kg/batch, [redacted] hr/batch, [redacted] imported PMN concentration, and [redacted] batches per year. RAD assumes 1 site, [redacted] PMN concentration, and [redacted] bt/yr. CS calculates a use rate of [redacted] kg/st-bt.

Process Description: Process Description: PMN imported (liquid, [redacted]) [redacted] (per CRSS and submission)

ENVIRONMENTAL RELEASES ESTIMATE SUMMARY

Water, Land: not expected for this site and handling procedure. The submission indicates that the site uses the same waste handling for all steps: all releases generated throughout the process are disposed of via a licensed hazardous waste hauler and sent off-site to an appropriate TSDF for incineration. Air - negligible (VP < 0.001 torr, no mist from this process).

Incineration
High End: [redacted] kg/site-day over [redacted] days/yr from 1 site
or [redacted] kg/site-yr from 1 site or [redacted] kg/yr-all sites
to: Off-site incineration (submission)
from: Cleaning Liquid Residuals from Drums Used to Transport the Raw Material
basis: EPA/OPPT Drum Residual Model, CEB standard 3% residual. Submission estimates 0.1 kg PMN residue in container. EPA model is more conservative. Container rinsate is placed in the mixing vessel and the empty container is transported offsite for incineration.

Incineration
Conservative: [redacted] kg/site-day over [redacted] days/yr from 1 site
or [redacted] kg/site-yr from 1 site or 5.0E+2 kg/yr-all sites
to: Off-site incineration (submission)
from: Equipment Cleaning Losses of Liquids from a Single, Large Vessel

basis: EPA/OPPT Single Vessel Residual Model, CEB standard 1% residual. Submission estimates [redacted] (0.4% loss) release from various process activities. EPA model is more conservative.

RELEASE TOTAL
[redacted] kg/yr - all sites

OCCUPATIONAL EXPOSURES ESTIMATE SUMMARY
Tot. # of workers exposed via assessed routes: [redacted]
Basis: Submission estimates [redacted] workers exposed across [redacted] activities.

Inhalation:

negligible (VP < 0.001 torr); mists and aerosols are not expected to be generated from process.

Dermal:

Note, dermal exposures during container loading is not expected because the process is automated.

Exposure to Liquid at [redacted] concentration
High End:
> Potential Dose Rate: [redacted] mg/day over [redacted] days/yr
> Lifetime Average Daily Dose: [redacted] mg/day over [redacted] days/yr
> Average Daily Dose: [redacted] mg/day over [redacted] days/yr
> Acute Potential Dose: [redacted] mg/day over [redacted] days/yr
Number of workers (all sites) with dermal exposure: [redacted]
Basis: Unloading Liquid Raw Material from Drums; EPA/OPPT 2-Hand Dermal Contact with Liquids Model. Per November 2016 RAD guidance, default parameters for this model were updated: body weight (BW) was updated from 70 to 80 kg and Averaging Time over a Lifetime (ATc) was updated from 70 to 78 years.

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PMN: 18-0147

USE: [redacted]

Number of Sites/ Location: [redacted]

[redacted]

unknown site(s)

Days/yr: [redacted]

Basis: Submission indicates PMN (liquid, [redacted] used at [redacted] sites for [redacted] exposure days/year, and estimates [redacted] per site-day by referencing the [redacted]. RAD assumes [redacted] sites, 360 operating days/yr (per ESD), and PMN concentration of [redacted] CS calculates a PMN use rate of [redacted] kg/st-day.

Process Description: [redacted] (per submission; CRSS; ESD)

ENVIRONMENTAL RELEASES ESTIMATE SUMMARY

Air - negligible (VP < 0.001 torr, no mist expected for this process). Note submitter also provides release estimates using the ESD methodology, assuming ESD default photoresist use rate of [redacted] kg/site-day.

Water
Output 2: [redacted] kg/site-day over 360 days/yr from [redacted] sites
or [redacted] kg/site-yr from [redacted] sites or [redacted] kg/yr-all sites
to: Waste (per ESD)
from: Residuals from [redacted]
basis: User-Defined Loss Rate Model. Per ESD, combined [redacted]

Water or Incineration or Landfill
High End: [redacted] kg/site-day over 360 days/yr from [redacted]
or [redacted] kg/site-yr from [redacted] sites or [redacted] kg/yr-all sites
to: Water, incineration, or landfill (per ESD, submissions specifies off-site incineration)
from: Cleaning Liquid Residuals from Bottles Used to Transport the Raw Material
basis: EPA/OPPT Small Container Residual Model, CEB standard 0.6% residual. Submission estimates [redacted] kg PMN residue in container. EPA model is more conservative.

Incineration
Output 2: [redacted]kg/site-day over 360 days/yr from [redacted] sites
or [redacted] kg/site-yr from [redacted] sites or [redacted] kg/yr-all sites
to: Incineration (per ESD)
from: Application Excess [redacted]
basis: User-Defined Loss Rate Model. Per ESD, excess [redacted] loss has [redacted] (93% spin off assumed to maximize downstream water release). Submission estimates [redacted]kg PMN release. ESD is more conservative.

Incineration or Landfill
Output 2: [redacted] kg/site-day over 360 days/yr from [redacted] sites
or [redacted] kg/site-yr from 14 sites or [redacted] kg/yr-all sites
to: Incineration or Landfill (per ESD; submissions specifies off-site incineration)
from: Equipment Cleaning Losses of Liquids from a Single, Small Vessel

basis: User-Defined Loss Rate Model. Submitter estimates [redacted] release to incineration from equipment cleaning residue. Per ESD, RAD assumes 1% loss to incineration or land. [redacted]

RELEASE TOTAL
[redacted]kg/yr - all sites

OCCUPATIONAL EXPOSURES ESTIMATE SUMMARY

Tot. # of workers exposed via assessed routes: [redacted]

Basis: Submitter estimates a total of [redacted] workers potentially exposed over all activities at all sites. Per the ESD, EPA conservatively assumes [redacted] operators and [redacted] technicians exposed at each site. RAD assumes that all workers may be exposed at the highest potential exposures for each physical form, as conservative.

Inhalation:

Inhalation exposure is expected to be negligible for nonvolatile chemicals (VP < 0.001 torr) within liquid [redacted] use during [redacted].

Dermal:

Exposure to Liquid at [redacted] concentration
High End:
> Potential Dose Rate: [redacted] mg/day over 360 days/yr
> Lifetime Average Daily Dose: [redacted] mg/day over 360 days/yr
> Average Daily Dose: [redacted] mg/day over 360 days/yr
> Acute Potential Dose: [redacted] mg/day over 360 days/yr
Number of workers (all sites) with dermal exposure: [redacted]
Basis: Operator Exposures; EPA/OPPT 1-Hand Dermal Contact with Liquids Model. Per ESD, assess 1-hand exposure to [redacted] operators/site. Per November 2016 RAD guidance, default parameters for this model were updated: body weight (BW) was updated from 70 to 80 kg and Averaging Time over a Lifetime (ATc) was updated from 70 to 78 years.

Exposure to Liquid at [redacted] concentration
High End:
> Potential Dose Rate: [redacted] mg/day over 360 days/yr
> Lifetime Average Daily Dose: [redacted] mg/day over 360 days/yr
> Average Daily Dose: [redacted] mg/day over 360 days/yr
> Acute Potential Dose: [redacted]mg/day over 360 days/yr
Number of workers (all sites) with dermal exposure: [redacted]
Basis: Technician Exposures; EPA/OPPT 2-Hand Dermal Contact with Liquids Model. Per ESD, assess 2-hand exposure to 18 technicians/site. Per November 2016 RAD guidance, default parameters for this model were updated: body weight (BW) was updated from 70 to 80 kg and Averaging Time over a Lifetime (ATc) was updated from 70 to 78 years.